July 8, 2003

TO: Internal File

THRU: Priscilla Burton, Senior Environmental Scientist, Lead

FROM: Jerriann Ernstsen, Environmental Scientist, Biology, Ph.D.

RE: Stockpile Area, Wildcat Loadout, Andalex Resources, Inc., C/007/033-AM03A.

SUMMARY

The Division received an amendment for a 0.92-acre expansion of disturbed area at the Wildcat Loadout on May 12, 2003. The location of the expansion is southeast of haul road PR-5 between sediment ponds A and B. The Permittee plans to use this area to stockpile coal. A grasshopper conveyor will feed the coal to the stockpile, which will ultimately have the height of 40 feet (Field Visit February 28, 2003).

The Permittee also plans to expand the stockpile area an additional 12 acres in the near future. Plans for future expansion must include implementation of fugitive dust control strategies. These strategies may include construction of silos around the coal stockpiles. In the biology section of this TA, the Division provided discussion of requirements for the pending 12-acre expansion. These discussions are not written as findings in this TA, but the Permittee must address these requirements before the Division authorizes the pending amendment. All requirements associated with the pending expansion are accompanied with the related regulations.

TECHNICAL ANALYSIS:

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

Page xviii of the table of contents references 27 plates. The Permittee must update the table of contents to reflect the correct number of plates.

Findings

Information provided in the application is not considered adequate to meet the minimum Permit Application Format and Contents section of the General Contents regulations. Prior to approval, the Permittee must act in accordance with the following:

R645-302-263 and R645-301-121.200, The Permittee must update the table of contents to reflect the correct number of plates.

The Permittee must clarify the discrepancy of the survey date(s) for the 1989 growth site/medium test-plot study (Chapter III pgs. 51 and Appendix N cover page). (See Vegetation section of Operations for more details).

The Permittee must include a cover sheet with the 1997 follow-up survey, conducted by Mt Nebo Scientific that clearly states that the plot descriptions are incorrect. Furthermore, any reference in the MRP to this survey must also include a disclaimer. (See Vegetation section of Operations for more details).

Findings:

Information provided in the application is not considered adequate to meet the minimum Reporting of Technical Data section of the General Contents regulations. Prior to approval, the Permittee must act in accordance with the following:

R645-302-263 and R645-301-121.200, The Permittee must clarify the discrepancy of the survey date(s) for the 1989 growth site/medium test-plot study (pgs. 51 and Appendix N cover page).

R645-302-263 and R645-301-121.200, The Permittee must include a cover sheet with the 1997 follow-up survey, conducted by Mt Nebo Scientific that clearly states that the plot descriptions are incorrect. Furthermore, any reference in the MRP to this survey must also include a disclaimer.

The boundary lines for the disturbed area do no match among certain maps in the MRP, e.g., Plates 1, 16, and 22. The Permittee must clarify disturbed boundary lines among all maps.

Findings:

Information provided in the application is not considered adequate to meet the minimum Maps and Plans section of the General Contents regulations. Prior to approval, the Permittee must act in accordance with the following:

R645-302-263 and R645-301-121.200, The Permittee must clarify disturbed boundary lines among all maps.

Analysis:

The Permittee must address the following editing corrections in Chapter III Appendix F:

- Page 50 of the MRP states no TE species, which is inconsistent with the TE species listed in Appendix F, such as the golden eagle (pg. 97).
- Appendix F (e.g., pages 92 and 98) refers the reader to Appendix A for a list of protected species that inhabit the project area – Appendix A is the Archeology Report.
- The text on pages 100-102 does not flow from page to page.

Findings:

Information provided in the application is not considered adequate to meet the minimum Completeness section of the General Contents regulations. Prior to approval, the Permittee must act in accordance with the following:

R645-302-263 and R645-301-121.200, The Permittee must correct the inconsistencies, incorrect reference, and incorrect pagination explained above.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

VEGETATION RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.19; R645-301-320.

Analysis:

Appendix I contains the 1988 Vegetation Resource Information survey for the current reference area conducted by Nicolas van Pelt. This surveyor examined the following:

- Site condition and features.
- Cover.
- Shrub density.
- Shrub height.

van Pelt's survey was thorough of the reference area, but was not comprehensive. The survey did not include a full examination of proposed permit area or areas affected by surface operations. This survey also did not include estimations of productivity. Although the permit area and off-site locations east of operations are already disturbed from fugitive coal fine dust, the Permittee must conduct a vegetation survey of the area outside the permit area. The measurements must include all parameters listed in the DOGM Vegetation Information Guidelines (R645-301-321.100, R645-301-321.200). The off-site areas must include affected areas east of the eastern fence line and unaffected areas with the same community type. The provided survey does not provide the Division adequate information on areas that have never been impacted by mining operations. The survey of the affected area east of the permit area should include examination of coal-fine occurrence to determine the extent of impact at this time. This survey will provide the Division with criteria needed to develop a mitigation plan for the critical deer winter-range habitat (more details in Operations).

van Pelt (1988) states that the reference area was unaffected by mining operations (pg. 2), in fair to good condition (pg. 4), *slightly covered with coal fines* (pg. 3), and no signs of long-term composition change (pg. 4). The primary species listed by van Pelt include sagebrush and Indian rice grass. The secondary species include galleta, winterfat, pricklypear, low rabbitbrush, downy brome, and needle and thread. There were no biologic crusts observed (pg. 3).

The Division examined the far southeast corner of the permit area July 2, 2003. Visual inspection of the area revealed that the site is in extremely poor condition. The mature sagebrush to the east of the coal stockpile are dead or dying. There are a few younger sagebrush plants present. Without official age analysis, these younger sagebrush may be the seedlings van Pelt

refers fifteen years ago (pg. 4). There is a considerable amount of cover from curing cheatgrass as well as a thick layer of cheatgrass thatch. There are other weedy plants presents in high numbers, e.g., tumbleweed. There are a few plants of globe mallow and Indian rice grass. This area contains no cryptogamic soil. Visual inspection of the area suggests that the area has changed in composition and condition.

A site for the proposed relocated reference area is northeast of operations and southwest of the county road. The current reference area is in much poorer condition and contains fewer numbers of species and plants compared to the proposed site. The current reference area is mostly covered with coal fines (visual inspection 2-26-03). The depth of the coal fines varies from slightly to deeply covering the soil surface. This variation may be related to water and wind dispersal. The proposed relocated reference area has patches without fines and other patches that are slightly covered. Without statistical analysis, there is no other reason other than coal fines accounting for these differences in vegetation condition, and number of species and plants.

Across the drainage and approximately 50-100 feet southeast of the proposed relocated reference area is a site that is also in very poor condition. For the pending 12-acre amendment, the Permittee must evaluate this site along with the proposed relocated reference area before the Division authorizes the proposed relocated reference area. This evaluation must include coal fine measurements and vegetation analysis. The Division needs to determine the reason why the condition of the site just across the drainage is in such poor condition and if this reason will eventually impact the proposed relocated reference area. The Permittee must conduct these surveys before the 12-acre expansion is authorized. (Refer to R645-301-321.100, R645-301-321.200, R645-301-323.100, R645-301-323.400).

Findings

Information provided in the application is not considered adequate to meet the minimum Vegetation Resource Information section of the Environmental Resource Information regulations. Prior to approval of this amendment, the Permittee must act in accordance with the finding(s) below. In advance, the Permittee must also address the Division's concerns noted above prior to the 12-acre expansion amendment.

R645-302-263 and R645-301-321.100, -200, The Permittee must conduct a vegetation survey.

FISH AND WILDLIFE RESOURCE INFORMATION

Regulatory Reference: 30 CFR 784.21; R645-301-322.

Analysis:

Appendix F provides a wildlife resources overview of the area, but this overview is not accompanied with survey date or surveyor name. The Appendix states that, in the Wasatch Plateau, there are 364 wildlife species with 168 species likely to occur at the coal loadout area. Furthermore, that 98% of the 168 species or their habitats are protected at some point in time (pg. 92) throughout a year.

The Permittee provides little information concerning threatened, endangered (TE), or state protected animal and plant species. Appendices F and I briefly mention TE of the area, but they do not meet the TE survey requirement. The MRP states that there are no known TE species according to UDWR (pg. 50); however, there is no accompanying survey date, surveyor name, or supporting data.

Although Appendix F overview is apparently comprehensive, there is no indication of an actual survey or ground-truthing. The Permittee must conduct a survey for TE animal and plant species (R645-301-322.210). This survey must include the relocation site for the revegetation reference area and adjacent areas to the permit boundary. Other matters concerning Appendix F that the Permittee must address include the following editing corrections: (See R645-301-121.200 in General Contents)

- Page 50 of the MRP states no TE species, which is inconsistent with the TE species listed in Appendix F, such as the golden eagle (pg. 97).
- Appendix F (e.g., pages 92 and 98) directs the reader to Appendix A for a list of protected species that inhabit the project area – Appendix A is the Archeology Report.
- The text on pages 100-102 does not flow from page to page.

Findings:

Information provided in the application is not considered adequate to meet the minimum Fish and Wildlife Resource Information section of the Environmental Resource Information regulations. Prior to approval, the Permittee must act in accordance with the finding listed below and R645-301-121.200 in General Contents. In advance, the Permittee must also address the Division's concerns noted above prior to the 12-acre expansion amendment.

R645-302-263 and R645-301-322.210, The Permittee must conduct a survey for TE animal and plant species.

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

The boundary lines for the disturbed area do no match among certain maps in the MRP, e.g., Plates 1, 16, and 22. The Permittee must clarify disturbed boundary lines among all maps. (See R645-301-121.200 in General Contents).

For the pending 12-acre amendment, the Permittee must provide two vegetation maps. The Vegetation Information Guidelines provides descriptions of the map requirements. These maps will help determine impacts, if any, of the 12-acre expansion to plant species in the permit and adjacent areas. These maps must include the site of the relocated reference area.

For the pending 12-acre amendment, the Permittee must provide a wildlife map. This map will help determine impacts, if any, of the 12-acre expansion to the wildlife in the permit and adjacent areas.

Findings:

Information provided in the application is not considered adequate to meet the minimum Maps, Plans, and Cross Section Resource Information section of the Environmental Resource Information regulations. Prior to approval of this amendment, the Permittee must act in accordance with the finding R645-301-121.200 in General Contents. Advice is offered in the above analysis, concerning the permit requirements for the forthcoming 12-acre expansion.

OPERATION PLAN

FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

Protection and Enhancement Plan

The Wildcat Loadout surface property belongs to the Bureau of Land Management. Previous surveys and reports assign the mine site and neighboring lands as critical winter range for deer (Wildlife Enhancement Project, Appendix E; Chris Colt, DWR). The area east of the mine operations is, however, covered with coal fines. These fines may create a negative impact to the critical winter range for deer.

Surveyors examined the area for habitat and the possible effects of mining operations on wildlife. Nicholas van Pelt (1988; Appendix I) reports that this area supports prairie dogs as well as grazing from wildlife and domestic animal. The depth of the coal fines at that time was slight (pg. 2). This surveyor tallied many sage seedlings and rated this area in good to fair condition.

In 1999, Paul Baker (OGM) and Chris Colt (DWR) examined the area for possible effects of mining operations on the winter range for deer. Their observations show that the average coal fine depth increased from slight (1988) to 1.3 inches for the area east of mine operations. These surveyors also noted that the area south of operations had no coal fines and supported markedly more sagebrush and snakeweed compared to the area east of operations. This observation of sagebrush growing in nonaffected areas seems to agree with the van Pelt report. Baker and Colt also observed that the area east of operations supports markedly more winterfat and warm season grasses than the area south of operations.

Coal fines may impact deer winter range for a number of reasons. Coal fines are much darker than native soils, so comparatively fines:

- Absorb more solar radiation.
- Experience higher surface temperatures.
- Accelerate the rate of snowmelt.
- Accelerate the rate of evapotranspiration (loss of water from soil and plants).

Higher soil temperatures favor germination and growth of warm season compared to cool season plants. The grasses documented by Baker and Colt were blue grama and galleta, which are both warm season grasses. Although these low growing grasses provide forage, they may not be available to deer under minimal snow cover.

Low retention of snow cover and high rate of water loss in areas covered with fines may create drought conditions early in the growth season. Low water availability may negatively affect sagebrush more than winterfat because sagebrush is less drought tolerant than winterfat (Granite Seed index). Drought conditions may explain the decreased germination rate and persistence of sagebrush in coal-fine affected areas (Baker and Colt). Because sagebrush is more palatable to deer than winterfat (Restoring Big Game Range in Utah, 1968, pgs. 85 and 95), coal-fine affected areas may not support adequate winter forage.

Patrick Collins and James Nyenhuis surveyed coal fine depth for the 0.92 area in March 2003. These surveyors divided the site into five transects 30 feet apart and each transect into 15 sampling sites 15 feet apart. The results show that the average coal fine depth had increased from 1.3 inches (1999) to 3 inches. The coal fine depth ranged from 1.19 to 3.2 inches. This range, however, was not correlated to the proximity of transects to the coal stockpile.

In summary, coal fine depth east of the coal stockpile increased from slightly covering the ground in 1988 to an average of 3 inches in 2003. Coal fines apparently affect plant growth conditions enough to alter representative plant species. The continued accumulation of coal fines and change in representative plant species may result in negatively affecting the critical winter habitat for deer. Appendix F (pg. 103) states that, "At a minimum, any project resulting in disturbance to wildland habitat must provide interim revegetation and plan for final reclamation/revegetation." Neither this current submittal nor the MRP provides a plan for the reclamation or revegetation of the disturbance caused to off-site locations to the east of the permit area. For the forthcoming 12-acre amendment, the Permittee must provide a plan for mitigating the off-site impacts to the wildland habitat caused by wind-blown coal fines (refer to R645-301-333, R645-301-358.100).

The Wildcat Loadout implemented a BLM-directed mitigation plan (Appendix E). The goal of the mitigation plan was to enhance one acre of adjacent critical winter habitat for every acre disturbed. This plan was intended only for the original "foot print" of the disturbed area. Because the mine plans to disturb another 0.92 acres immediately and 12 acres in the near future, it seems prudent to work with the BLM to design another critical deer habitat mitigation plan. For the forthcoming 12-acre amendment, the Division will coordinate and consult with the BLM and DWR to design a new mitigation plan for the pending 12-acre amendment. The Permittee agrees to work with these agencies concerning the mitigation plan and implementation (personal phone call with Mike Glasson, 6-24-03).

For the forthcoming 12-acre amendment, the Permittee must adopt aggressive measures to avoid future deposition of coal fines outside the existing permit area (Refer to R645-301-333, R645-301-358.100). These measures may include construction of silos around coal stockpiles. The goal is for these measures to help limit further coal-related impact to the critical winter habitat for deer as well as critical habitat for other wildlife species. The Permittee discusses past measures, which include expansion of disturbed area, vacuuming, and a dust control water-spray program. These measures may provide some fugitive dust control, however, they do not omit or significantly reduce off-site impact.

Endangered and Threatened Species

For the forthcoming 12-acre amendment, the Permittee must address the possible adverse effects to the four Colorado River endangered fish species: the Colorado pikeminnow, the humpback chub, the bonytail chub, and the razorback sucker. (Refer to R645-301-322; -333, -358.100). Effects must be addressed by calculating the amount of water used by operations. Consumption estimates should include evaporation from ventilation; coal preparation; sediment pond evaporation; postmining inflow to workings; coal moisture loss; and direct diversions. The U.S. Fish and Wildlife Service require mitigation if the loss is estimated to be greater than 100 acre-feet per year.

Findings:

Information provided in the application is considered adequate to meet the minimum Fish and Wildlife Information section of the Operation Plan regulations. The Permittee, however, must address the Division's concerns noted above prior to submitting the 12-acre expansion amendment.

VEGETATION

Regulatory Reference: R645-301-330, -301-331, -301-332.

Analysis:

The Permittee conducted two separate test plot studies. The first project (1989) addressed the question of whether on-site fill material is suitable to use as growth medium. The materials and methods included the following:

- Four plots were selected on the permit area: A, B, C, D (see Plate 1 of MRP).
- All plots were fertilized, tilled, mulched with alfalfa, and seeded with the interim seed mix.
- All plots were surveyed and analyzed in 1991 by Patrick Collins (Appendix N).

The treatments were basically the location sites of the fill material. The follow-up survey report (1991, Appendix N) shows that all the plots were weedy and many of the seeded species were not present or present in significant numbers. The percent cover ranged from 41% to 52%. The most dominant species was *Kochia scoparia*, which is considered a noxious weed in four states – including Colorado. Plot B showed the most positive result with 30% of its 52% cover attributed to the seeded grasses. Plot B is near the substation, east of the railroad tracks. The Division briefly examined Plot B during a field visit (January 30, 2003) and the plot is still dominated by grasses (species unidentified) and without shrubs.

The MRP states that follow-up surveys were conducted in 1992 and 1993, but the report shows the date as 1991. There were no other related surveys provided in the MRP. The Permittee must clarify the discrepancy of the survey date(s) (pgs. 51 and Appendix N cover page). (See R645-301-121.200 in General Contents). The MRP also states that if the results of the 1993 survey were negative, then the Permittee would initiate a new growth medium test-plot study (pg. 51 last paragraph). The Division has no record of a similar growth medium test plot study conducted after 1989. The results of the 1991 survey report are inconclusive as to whether the fill material is suitable to use as growth medium. If the Permittee plans to use the fill, then more research is required to show reclaimability of the material. The Permittee must coordinate with the Division to determine the best protocol and test treatments to apply concerning fill material (R645-301-341.300).

The second test plot study addresses the question of which plant growth amendments provides the most favorable condition for seed germination and plant growth on topsoil. The materials and methods included the following:

- Four plots were selected on topsoil stockpile B: 1, 2, 3, 4.
- All plots were gouged, mulched with alfalfa, and seeded with the interim seed mix.
- Four plot treatments were: (pg. 52)

	PLOT 1	**PLOT 2**	**PLOT 3**	**PLOT 4**
Incorporated alfalfa	NO	NO	YES 3-4 Ton/acre	YES 1 Ton/acre
1.5 Ton/acre straw	YES	NO	NO	YES
1.5 Ton/acre excelsior 1-sided netting	NO	YES	NO	NO
Biodegradable netting	YES	YES	NO	YES
Irrigate	YES	YES	NO	NO

The 1997 follow-up survey report (DOGM Incoming File 2003) states that Patrick Collins did not conduct the study and could not substantiate the treatments at the time of the survey (pg. 1). The consultant assigned test plots numbers 1-4, but treatment definitions are scrambled from the definitions provided on page 52. The Permittee must include a cover sheet with the 1997 follow-up survey that clearly states that the plot descriptions are incorrect. Furthermore, any reference in the MRP to this survey must also include a disclaimer. (See R645-301-121.200 in General Contents).

The results of the 1997 survey are inconclusive on whether certain plant growth amendments provide higher success rates than other amendments. The Permittee must coordinate with the Division to determine the best protocol and test treatments to apply concerning plant growth amendments (R645-301-341.300). To prevent incorrect application of the

amendments or timing of seeding, the Division strongly recommends that a consultant familiar with experimental design directs the project implementation (R645-301-132).

Although differences among the amendment treatments are not conclusive, the overall result shows the following:

- Percent cover ranged from 41% to 52% with no marked difference among the treatments.
- Seeded *Kochia prostrata* and *Agropyron cristatum* accounted for a higher percent cover than other seeded or weedy species.
- *Kochia scoparia* and *Malcomia africana* were the dominant invader forb species.
- Woody plant density ranged from 1,118 to 57,514 (Plot "1") plants per acre.

All the sites were not considered particularly weedy. The range of percent cover from *Kochia prostrata* and *Agropyron cristatum* was 56% to 83%. Plot "3" had the 56% value and had 9% *Kochia scoparia*, which was the highest cover percentage from a weedy species.

The two different studies conducted in 1989 and 1994 were different. However, comparing the overall results of these studies, it may be advisable to amend plant growth medium. The average percent cover for the two studies were not markedly different, yet amended soils (1994) seemed to provide an environment less conducive to weedy species invasion than to unamended fill (1989). The Division cannot decisively recommend specific plant growth amendments or fill-material for final reclamation based on these two studies. The Division provides a few suggestions in the Reclamation section below.

Findings:

Information provided in the application is not considered adequate to meet the minimum Vegetation section of the Operation Plan regulations. Prior to approval, the Permittee must act in accordance with the findings listed below and R645-301-121.200 in Permit Application Format and Contents.

R645-302-263 and R645-301-341.300,,(1) The Permittee must coordinate with the Division to design the growth medium (fill) study if the Permittee plans to use the fill material as growth medium during reclamation (2) The Permittee must coordinate with the Division to determine the best protocol and test treatments to apply concerning plant growth amendments.

RECLAMATION PLAN

GENERAL REQUIREMENTS

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

Analysis:

Coal fines are located on the 0.92 area. Page 80B of the MRP states that coal fines will be removed by vacuuming. The current amendment states that the Permittee will remove the coal fines by scraping off the top layers. The salvaged topsoil will be added to an existing topsoil pile. The Division suggests conducting a reclamation treatment study (similar study to the 1994 study) on the relocated topsoil pile. (The Permittee must consult with the Division prior to implementation of any vegetation study. The Division will provide suggestions for updated interim and final seed mixes as well as plant growth amendment at that time.)

The Permittee must omit the following non-native species from the interim and final seed mixes: crested wheatgrass, Russian wildrye, forage kochia, alfalfa, and yellow sweetclover as well as reduce seed rate of whitestem rabbitbrush (R645-301-353.120). The Permittee must present the seed mix lists in table format, which include botanical and common names, pure live seed per foot, pure live seed per acre, total pure live seed per foot, total pure live seed per acre. Currently, the table provide seed rates in pound per acre. These values do not provide the Division with the necessary information to determine if the rates are adequate for stabilization.

The MRP states that during final reclamation, the topsoil will be roughened, 3-4 Ton/acre alfalfa incorporated, and excelsior matting and chicken wire applied. The Permittee must change the final seed mix in the MRP prior to approval of this amendment as noted above. ?

Aside from recommending a change in the seed mix, the Division cannot adequately evaluate the final reclamation plan because there are no conclusive results for the fill and amendment studies.

Page 84 in the MRP provides a reclamation table. The table shows that the reclamation project includes applying nitrogen fertilizer in April, which is 5-6 months prior to seeding. It is unclear the purpose of applying nitrogen to an area without plants. Furthermore, many nitrogen fertilizers are mobile and would quickly percolate through the soil stratum. The Permittee may want to consult with the Division to determine the need to apply nitrogen fertilizers.

Findings:

Information provided in the application is not considered adequate to meet the minimum General Requirements section of the Reclamation Plan regulations. Prior to approval, the Permittee must act in accordance with the following:

R645-302-263 and R645-301-353.120, The Permittee must omit the following species from the interim and final seed mixes: crested wheatgrass, Russian wildrye, forage kochia, alfalfa, and yellow sweetclover as well as reduce seed rate of whitestem rabbitbrush. The Permittee must present the seed mix lists in table format, which include botanical and common names, pure live seed per foot, pure live seed per acre, total pure live seed per foot, total pure live seed per acre.

RECOMMENDATIONS:

Do not approve the MRP until all deficiencies have been addressed.

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